



HCI: THE DESIGN PROCESS

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First, the news...

- Make Your UX Design Process Agile Using Google's Methodology
- <https://www.interaction-design.org/literature/article/make-your-ux-design-process-agile-using-google-s-methodology>

Accessibility

Basic steps to accessibility

- Add appropriate alt text to every image
- Use headings correctly
- Make your forms work with screen readers
- Use a “Skip to Main Content” link at the beginning of each page
- Make all content accessible by keyboard
- Create significant contrast between your text and background
- Use an accessible template

Add appropriate alt text to images

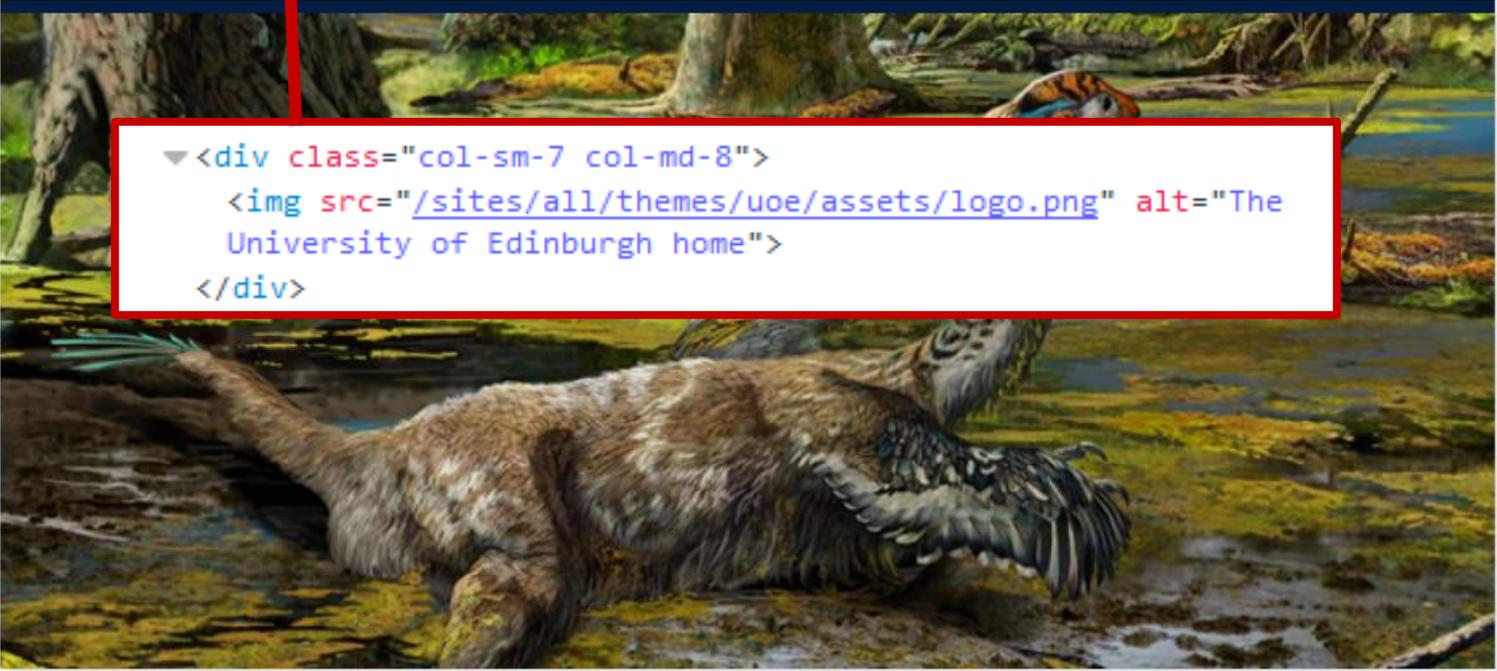
Study Visit Research News About Alumni Staff Students

 THE UNIVERSITY
of EDINBURGH

Schools & departments

Search 

```
▼ <div class="col-sm-7 col-md-8">  
    
</div>
```





Fangs output for: BBC - Home

Reload Preferences

Help and tutorial ?

Screen reader output Headings list Links list

Screen reader output

Page has ninety-six headings and one hundred fifty-one links BBC dash Home dash Internet Explorer Link Homepage **Heading level two** Accessibility links List of two items bullet This page link Skip to content bullet Link Accessibility Help List end Link Sign in This page link Notifications List of nineteen items bullet Link News bullet Link Sport bullet Link Weather bullet Link iPlayer bullet Link TV bullet Link Radio bullet This page link More List end Link Search the BBC Edit Search the BBC **Heading level one** BBC Homepage **Heading level two** Welcome to the BBC Sunday, thirteen November Link Customise your Homepage Sign in with your BBC ID, or Register to see Weather, Local News and more. Link Sign in with your BBC ID, or Link Register to see Weather, Local News and more Link **Heading level three** Remembrance Sunday colon Services honour war dead From UK Link **Heading level three** Tsunami hits after powerful New Zealand quake From Asia Link **Heading level three** England face Australia in crucial Four Nations match . Live now. From Rugby League Link **Heading level two** News headlines Link **Heading level three** Nato chief's warning for Trump From US Election two thousand sixteen Link **Heading level three** France 'to extend state of emergency' From Europe Link **Heading level three** Iraq 'retakes ancient Nimrud from IS' From Middle East Link **Heading level two** Sport headlines Link **Heading level three** England draw Test as India cling on From Cricket Link **Heading level three** Will Rosberg win the battle in Brazil? From Formula one Link Watch video **Heading level three** Murray wants to end season 'on a high note' From Tennis Remove **Heading level two** three things we love today Link **Heading level three** How the internet reacted to an epic night of dance From BBC One Link **Heading level three** Hundreds join Walnut the whippet on his final 'walk' From England Link Watch video **Heading level three** Murray and Djokovic take on the mannequin challenge From Tennis Remove **Heading level two** Help us make the BBC Homepage better Want to opt in to our alternative page? Find out more Link here Dismiss Link Try it now **Heading level two** The BBC around the UK List of five items bullet Link Graphic slash pthree hundred six tteight .png Scotland bullet Link Graphic slash pthree hundred six trm.png ALBA bullet Link Graphic slash pthree hundred six tpeight .png Wales bullet Link Graphic slash pthree hundred six tpeight .png Cymru bullet Link Graphic slash pthree hundred six tqc.png NI List end Dismiss **Heading level two** Real dash life stories Link Listen to audio **Heading level three** Bataclan survivor colon It's changed me on every single level From BBC Radio five live Link Watch video **Heading level three** The teacher who has the world's loudest shout From Northern Ireland Link Listen to audio **Heading level three** Sole survivor 'miracle girl' tells of fatal air crash horror From BBC World Service Remove **Heading level two** Link Add more sections This

```

▼ <div id="orb-header" class="orb-nav-pri orb-nav-pri-white orb-nav-dyn"> ev
  ▼ <div class="orb-nav-pri-container b-r b-g-p">
    ▶ <div class="orb-nav-section orb-nav-blocks"></div> ev
    ▼ <section>
      ▼ <div class="orb-skip-links"> ev
        <h2>Accessibility links</h2>
        ▼ <ul>
          ▼ <li>
            <a href="#hp-bbc-homepage-content">Skip to content</a>
          </li>
          ▼ <li>
            <a id="orb-accessibility-help" href="/accessibility/">
              Accessibility Help</a>
          </li>
        </ul>
      </div>
    </section>
    ▶ <div id="mybbc-wrapper" class="orb-nav-section orb-nav-id orb-nav-focus orb-nav-id-default"></div>
    ▶ <nav class="orb-nav" role="navigation" aria-label="BBC"></nav>
    ▶ <div class="orb-nav-section orb-nav-search"></div>
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  </div>
  ▶ <div id="orb-panels"></div> ev
  ::after
</div>
</header>

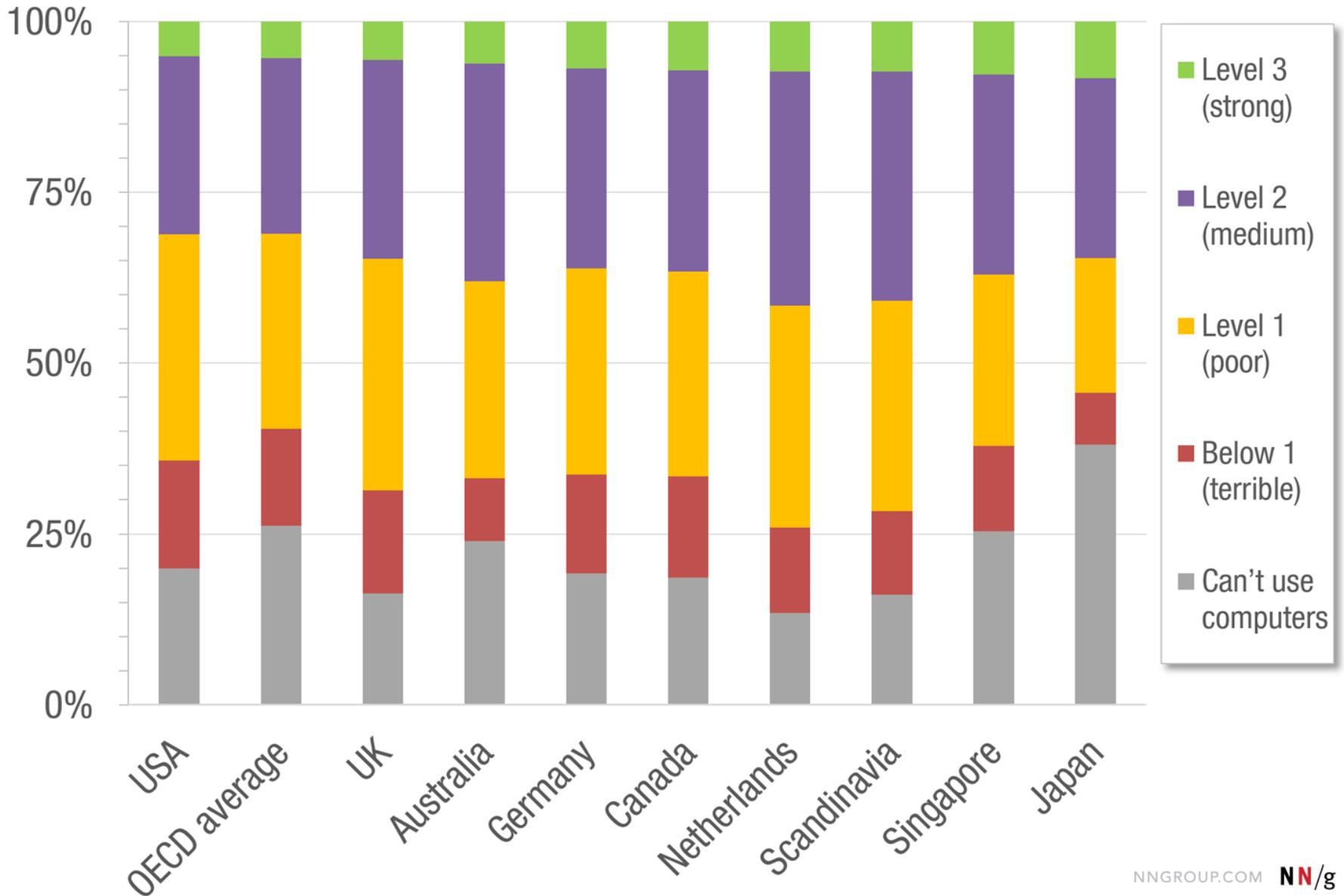
```

Headers

Skip to
content links

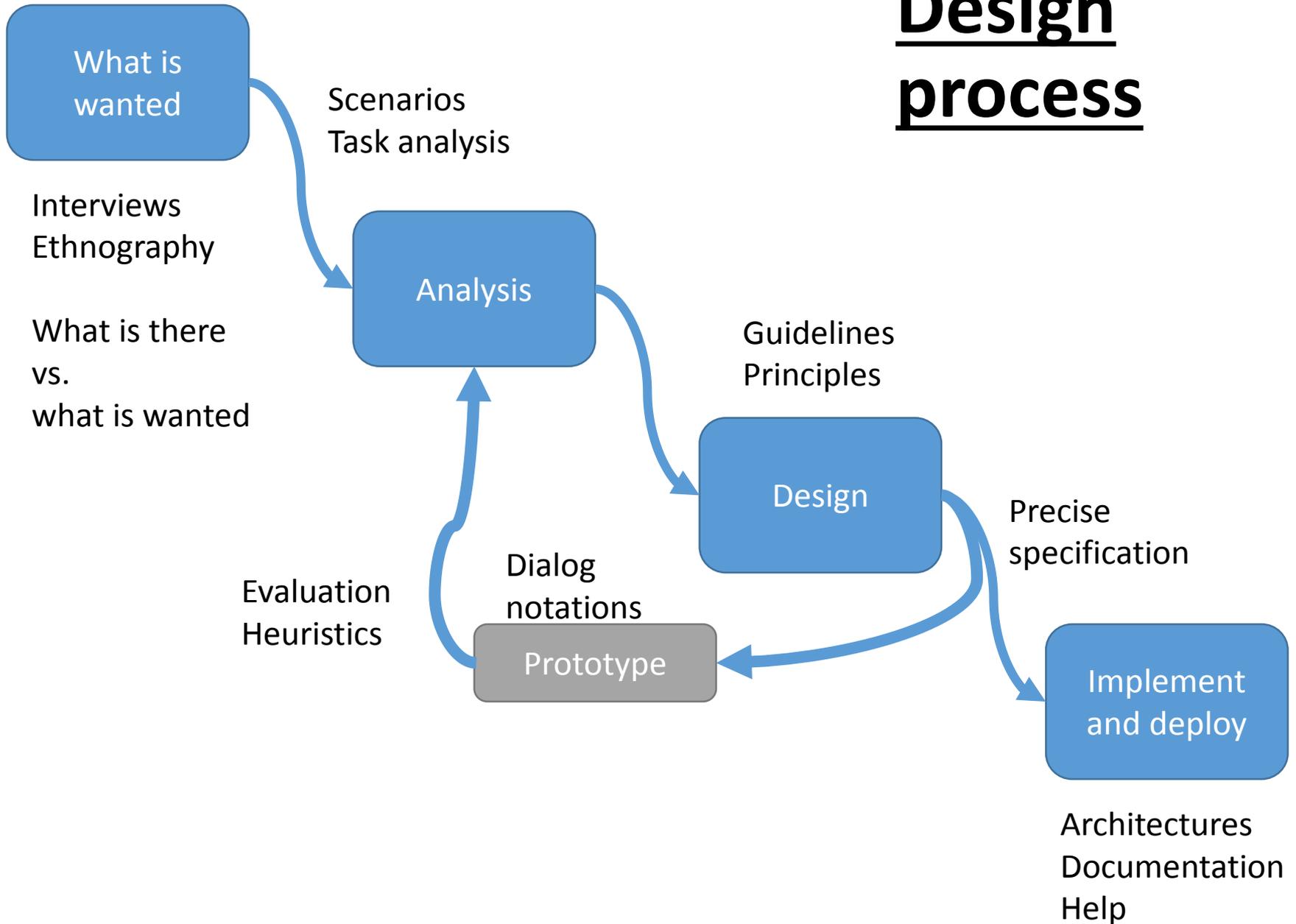
What level of technical skill can we expect out of “average” users?

Distribution of Computer Skills Among People Aged 16–65



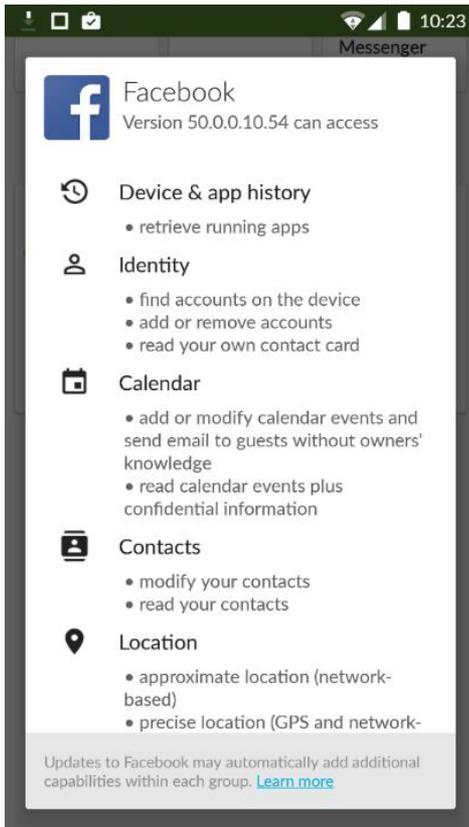
Design Process

Design process



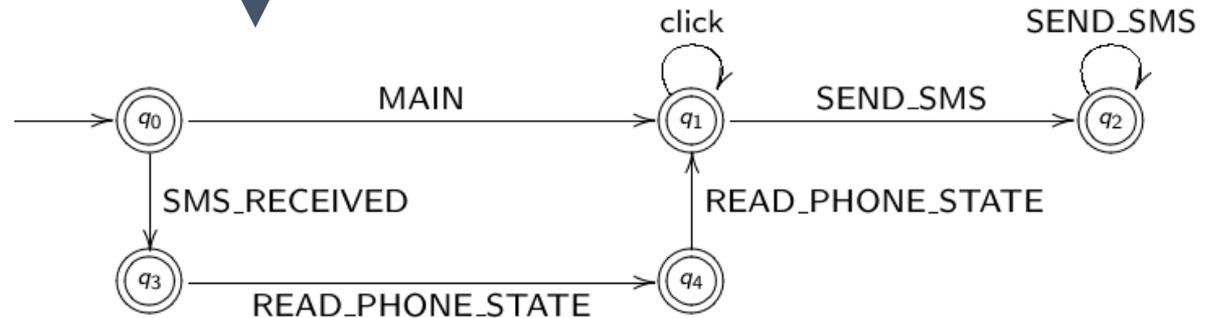
The following is part of a MSc project from last summer on re-designing permission screens for Android.

Describing how an app uses permissions

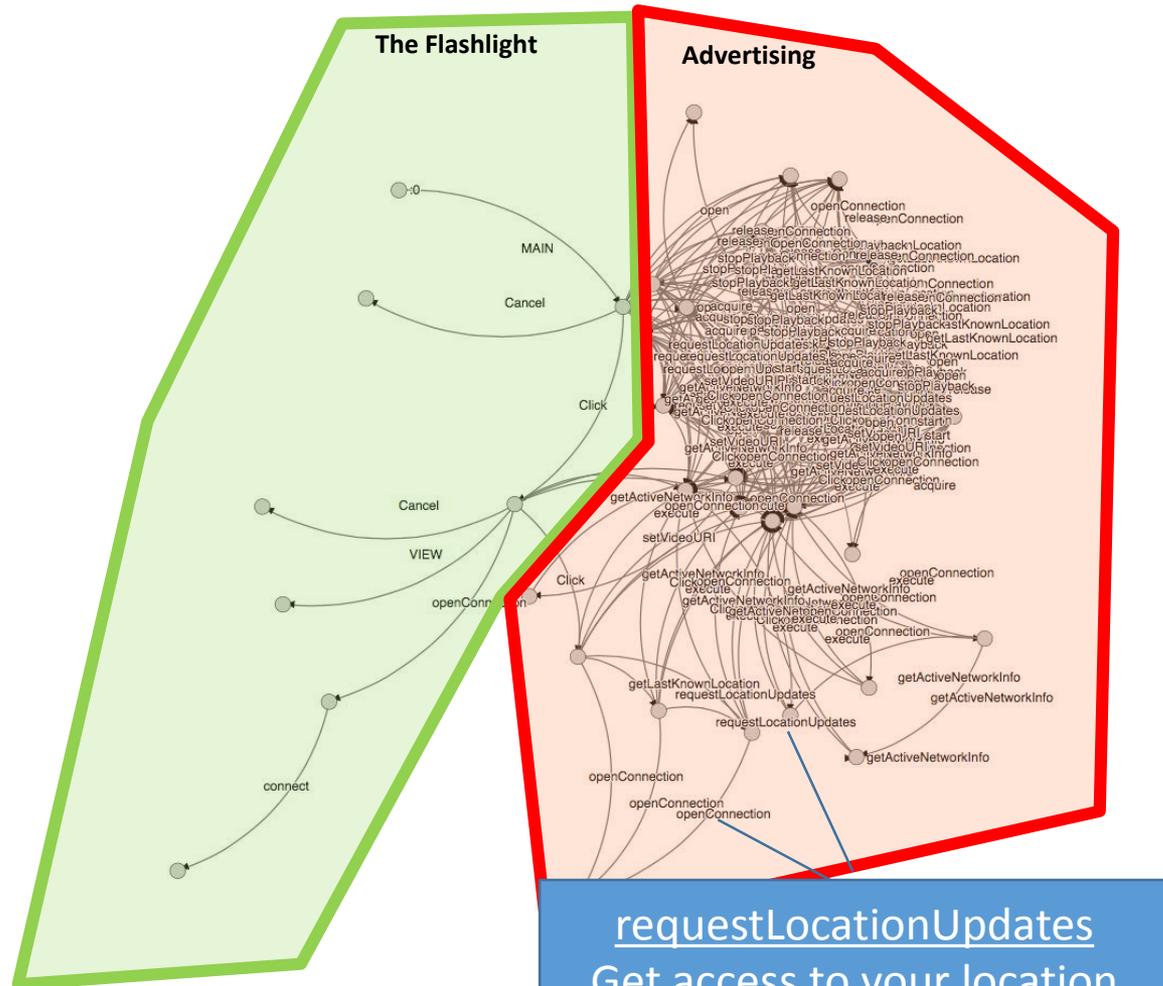


← Allowed to do

↓ Actually does



Static analysis: Breaks an app up into a control flow diagram



requestLocationUpdates
Get access to your location probably to send it on using the later openConnection call

The brief:

Create a new permission screen using the output from a static analysis tool that helps people understand the context in which permissions will be used.

Problem 1:

What permissions do people worry about?

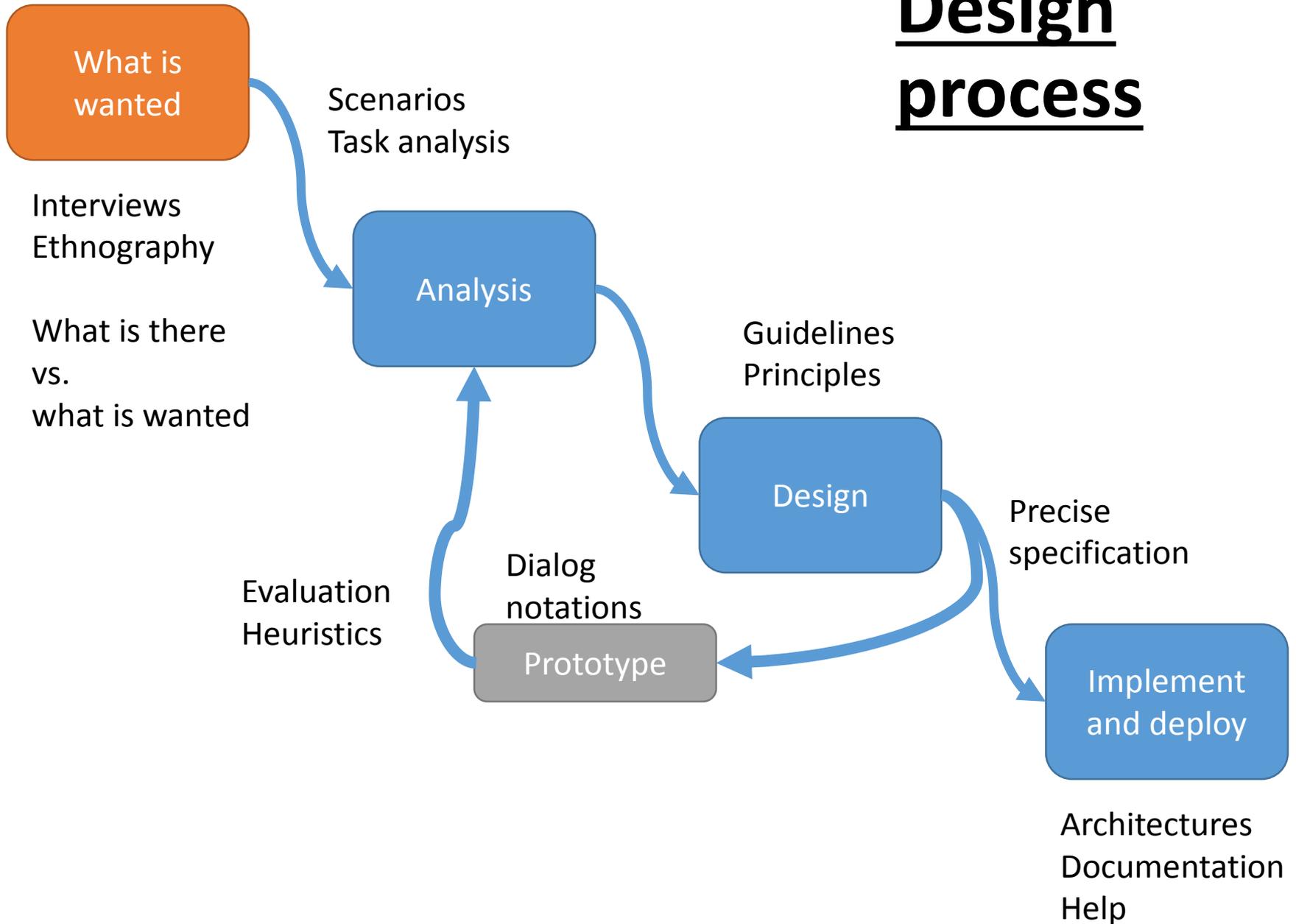
Sub-problem:

Most people don't understand permissions enough to actually worry about them

Solution:

**Affinity diagram using Computer
Security MSc students**

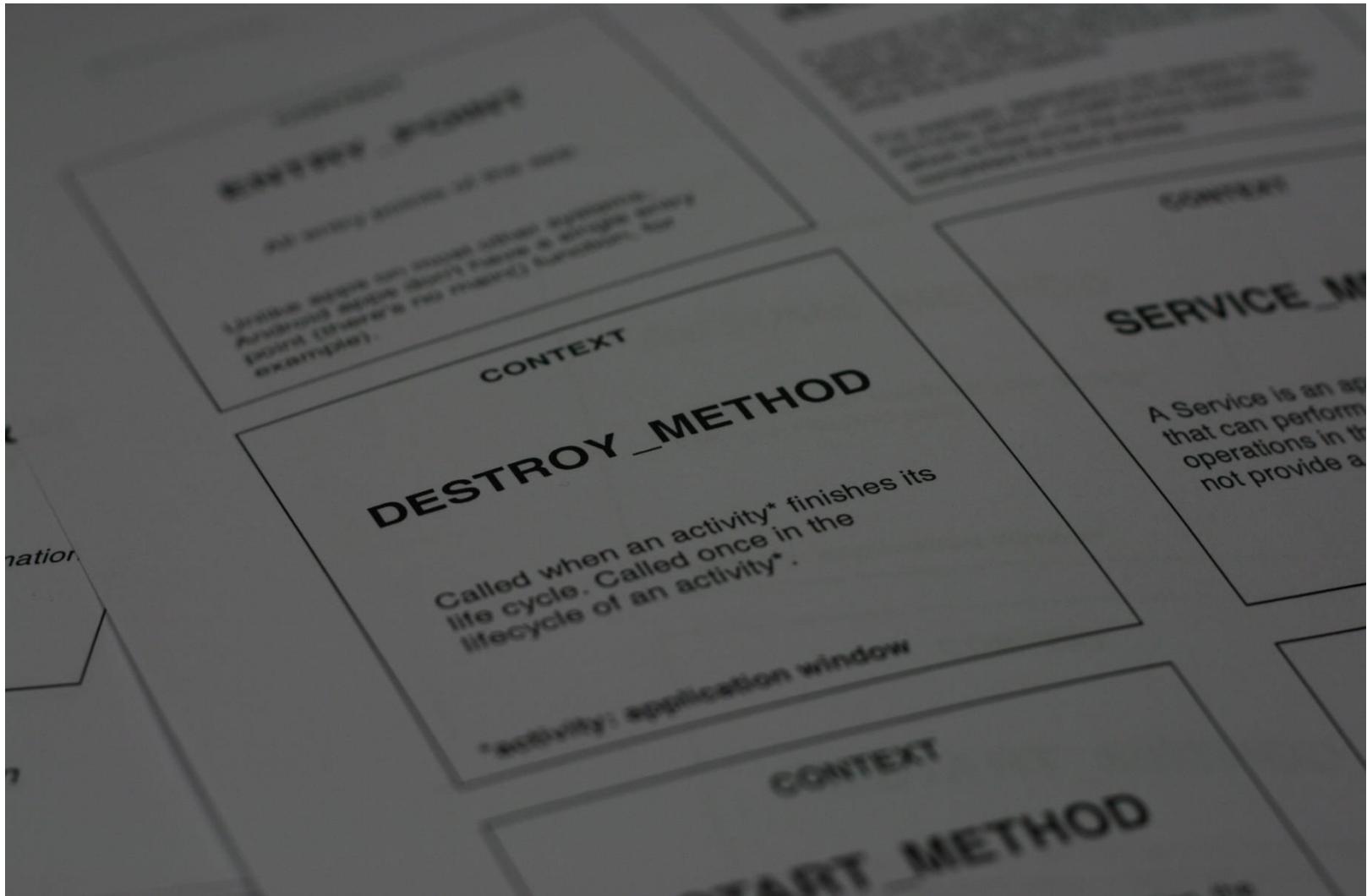
Design process



Protocol

1. Pre-print a list of Android permissions and contexts
2. Have students brainstorm answers to questions onto sticky notes
 - A. Name three permissions
 - B. App behaviors you are not comfortable with
 - C. Situations that would cause a permission to be used
3. Put all notes on the wall and do an affinity diagram
4. Encourage hierarchy design
5. Discuss outcome with participants as a group

Pre-printed contexts



Pre-printed contexts

PERMISSION

ACCESS_CHECKIN _PROPERTIES

Allows read/write access to the "properties" table in the checkin database, to change values that get uploaded.

PERMISSION

ACCESS_COARSE _LOCATION

Allows an app to access approximate location.

CONTEXT

DESTROY_METHOD

Called when an activity* finishes its life cycle. Called once in the lifecycle of an activity*.

*activity: application window

CONTEXT

SERVICE_METHOD

A Service is an application component that can perform long-running operations in the background and does not provide a user interface.

Examples of pre-printed and brainstormed sticky notes



CAMERA.

Push the  camera button

TAKING A PICTURE

ALLOW TO USE CAMERA

microphone / camera use without specifically having requested it.

USING CAMERA

PERMISSION
CAMERA
Required to be able to access the camera device.

Camera

OPEN CAMERA

CAMERA

USE CAMERA

Take a picture

APPS LIKE SNAP CHAT WOULD NEED TO USE YOUR CAMERA

Allow USE CAMERA

Taking a photo.

PERMISSION
CAPTURE_SECURE_VIDEO_OUTPUT
Allows an application to capture secure video output.

PERMISSION
CAPTURE_VIDEO_OUTPUT
Allows an application to capture video output.

Accessing Location

LOCATION / MAP

Retention
Record Location.

Permissions
Gather my location without my permission. (default setting)

PERMISSION
ACCESS_LOCATION_EXTRA_COMMANDS
Allows an application to access extra location provider commands.

PERMISSION
INSTALL_LOCATION_PROVIDER
Allows an application to install a location provider into the Location Manager.

PERMISSION
ACCESS_COARSE_LOCATION
Allows an app to access approximate location.

PERMISSION
LOCATION_HARDWARE
Allows an application to use location features in hardware, such as the geofencing API.

PERMISSION
CONTROL_LOCATION_UPDATES
Allows enabling/disabling location update notifications from the radio.

Modifying Location

PERMISSION
UNINSTALL_SHORTCUT
Allows an application to uninstall a shortcut in Launcher.

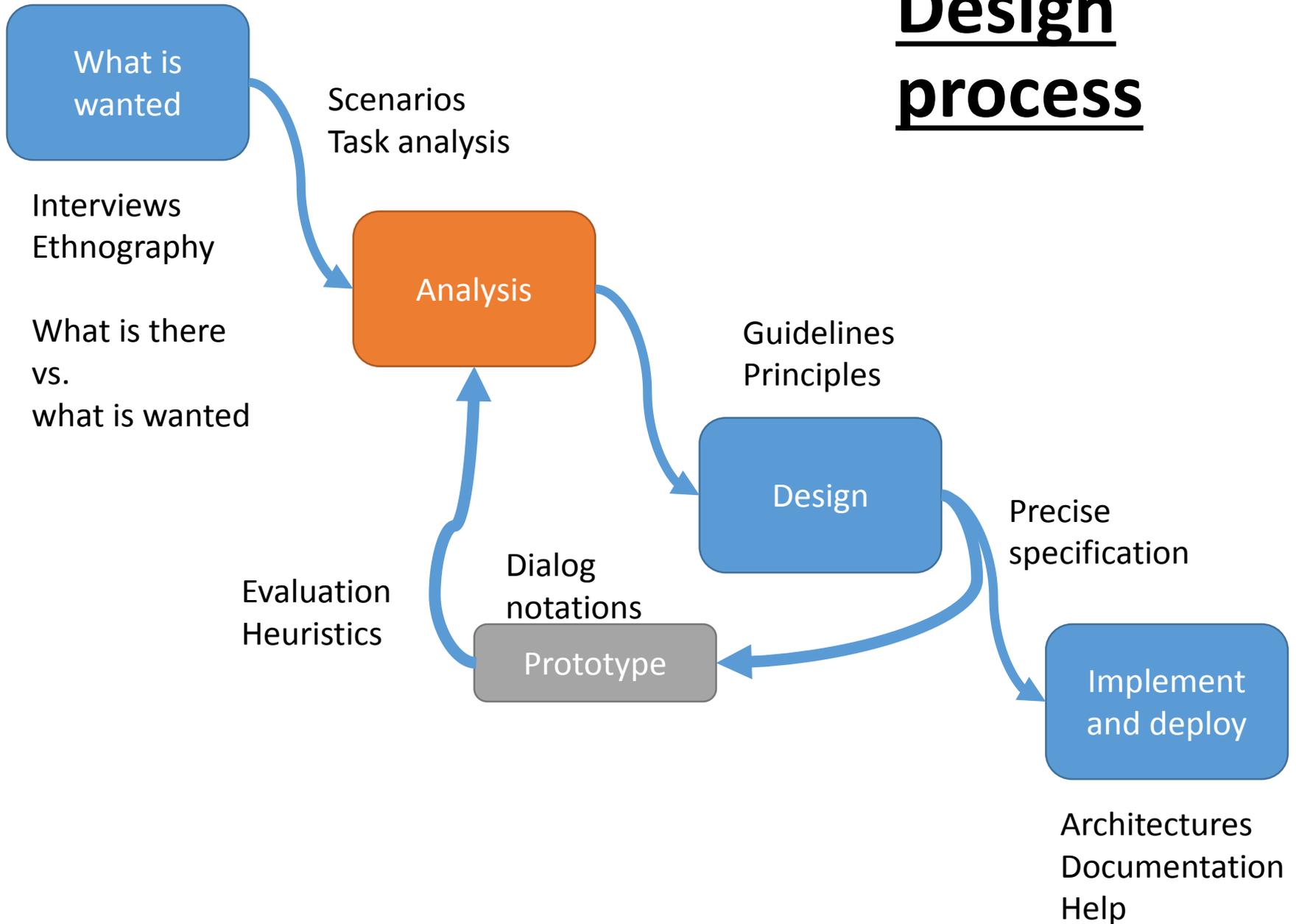
PERMISSION
INSTALL_SHORTCUT
Allows an application to install a shortcut in Launcher.

PERMISSION
BROADCAST_PACKAGE_REMOVED
Allows an application to broadcast a notification that an application package has been removed.

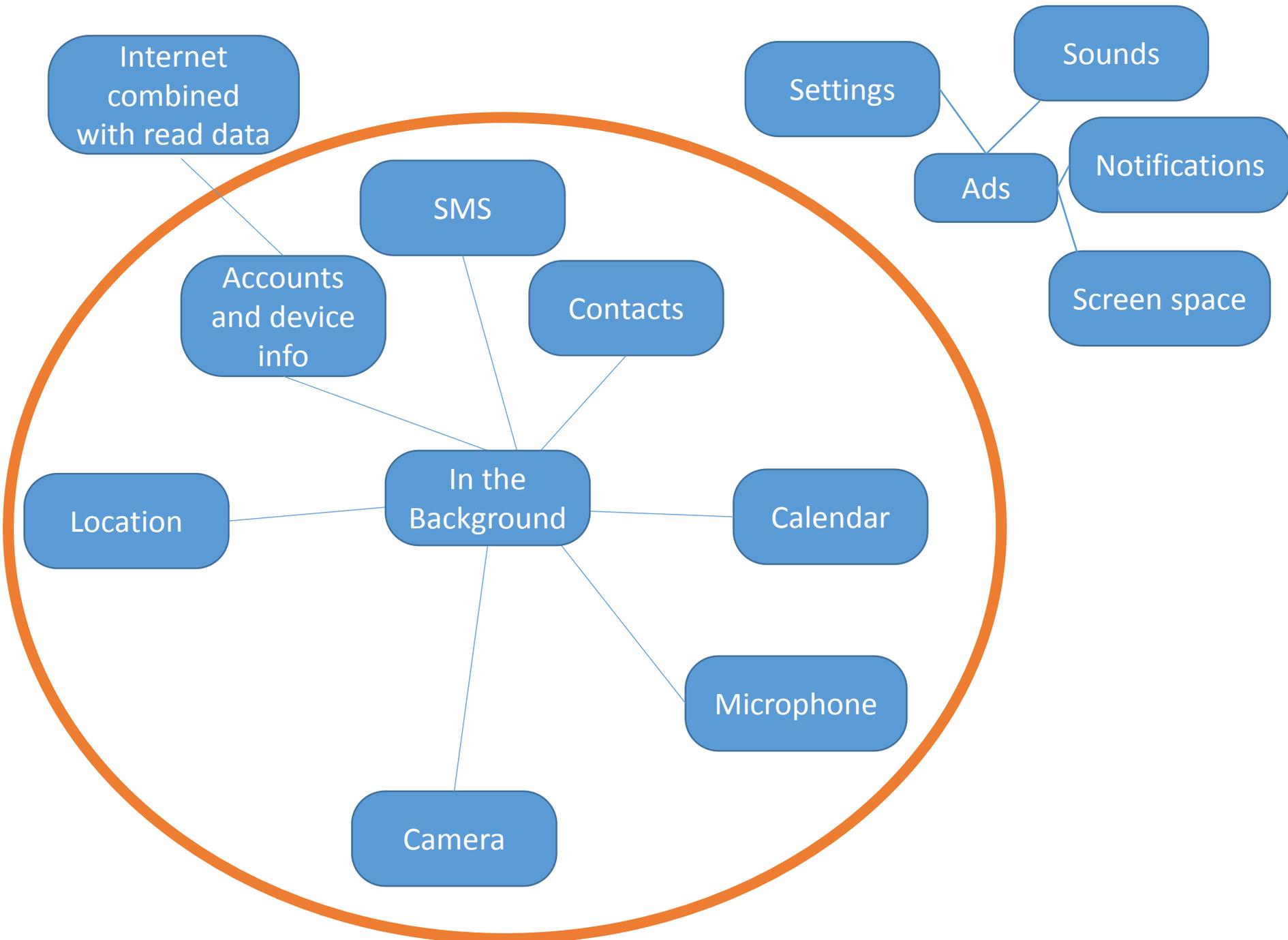
PERMISSION
REQUEST_INSTALL_PACKAGES
Allows an application to request installing packages.

PERMISSION
DELETE_PACKAGES
Allows an application to delete packages.

Design process

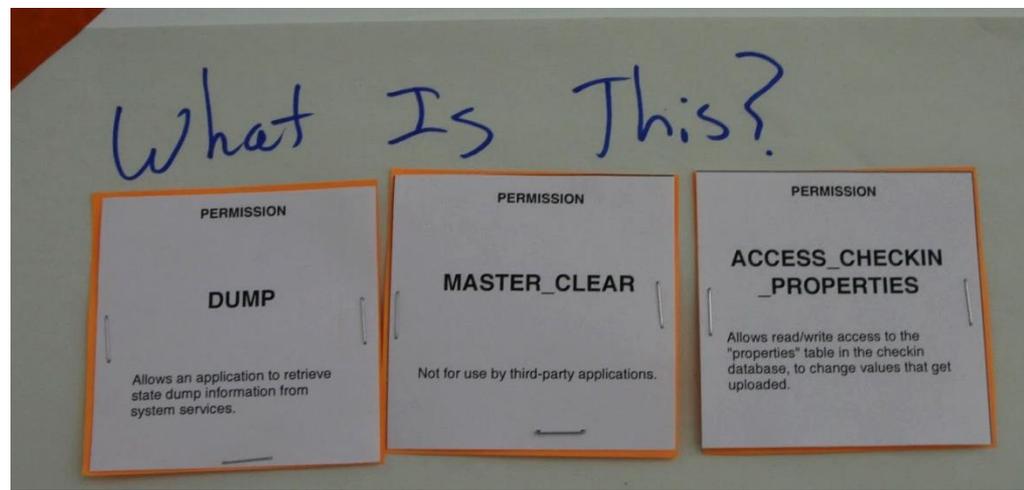




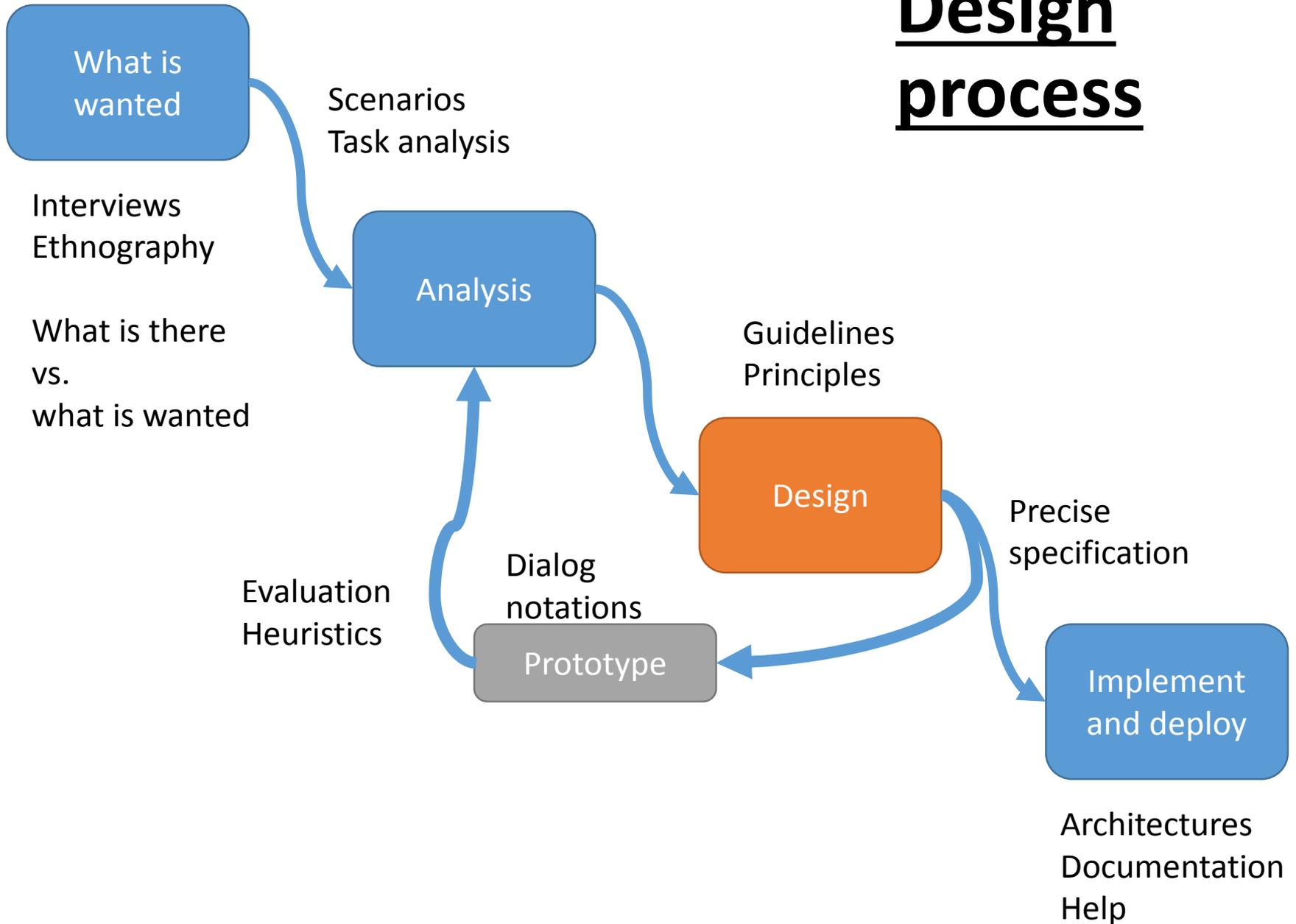


Outcomes

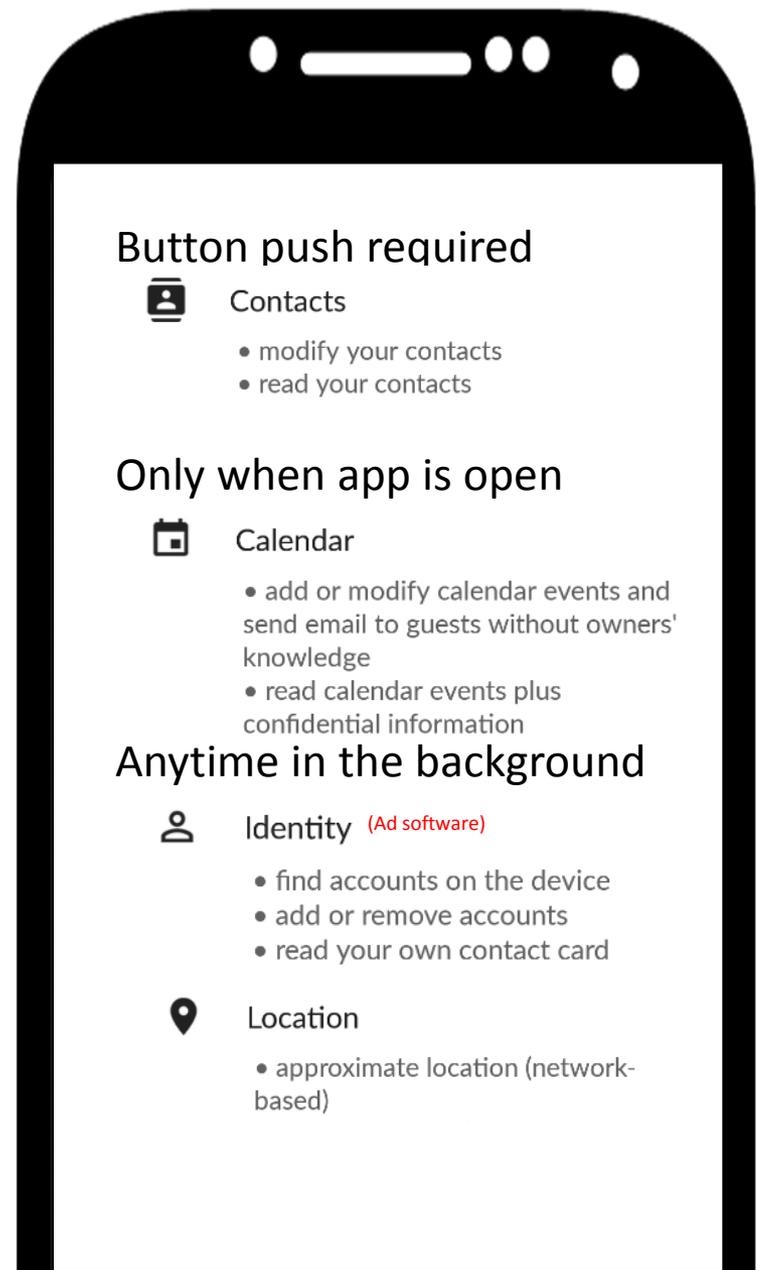
- “with my permission”
 - Button presses
 - Opening an app
- Background vs. foreground
 - When the permission is accessed is important
- Purpose
 - Ads
 - Uploading private data like contacts and device ID
- Sensitive permissions focused on input/output
- Confusing permissions



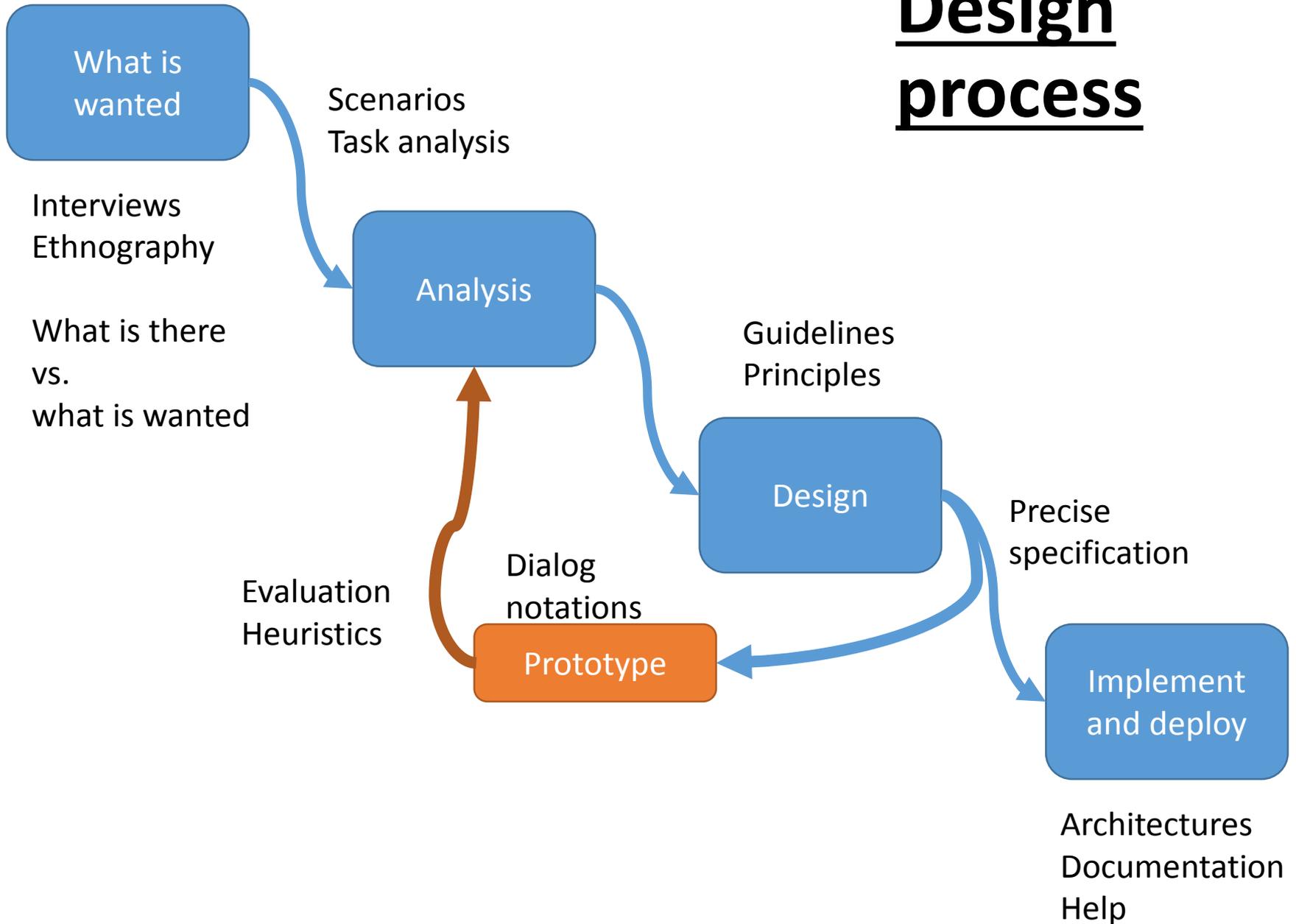
Design process



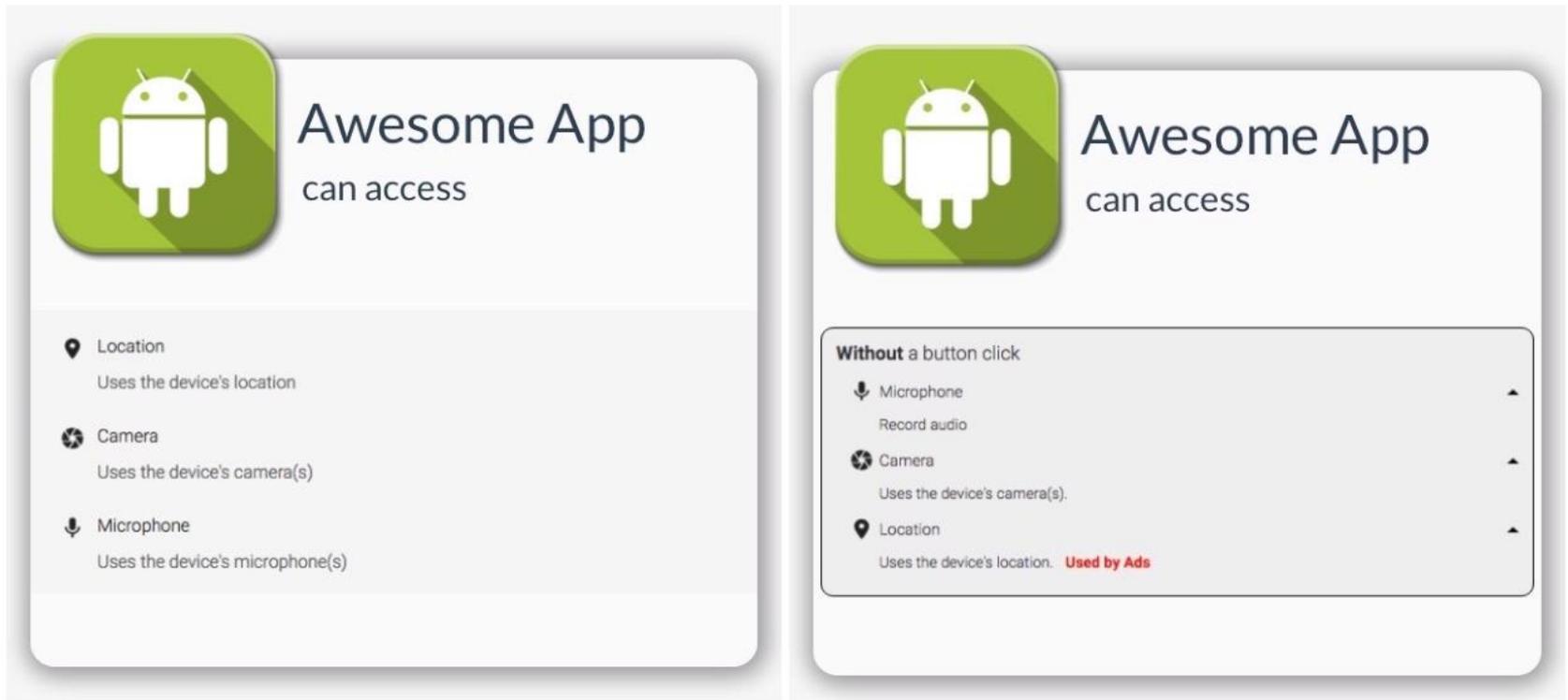
We designed an interface that shows permissions in context of when they can be used.



Design process



Created two interfaces to A/B test



(a) Control group screen

(b) Experiment group screen

Figure 5.1: Survey question screens



Awesome App

can access

- Location
Uses the device's location
- Camera
Uses the device's camera(s)
- Microphone
Uses the device's microphone(s)



Awesome App

can access

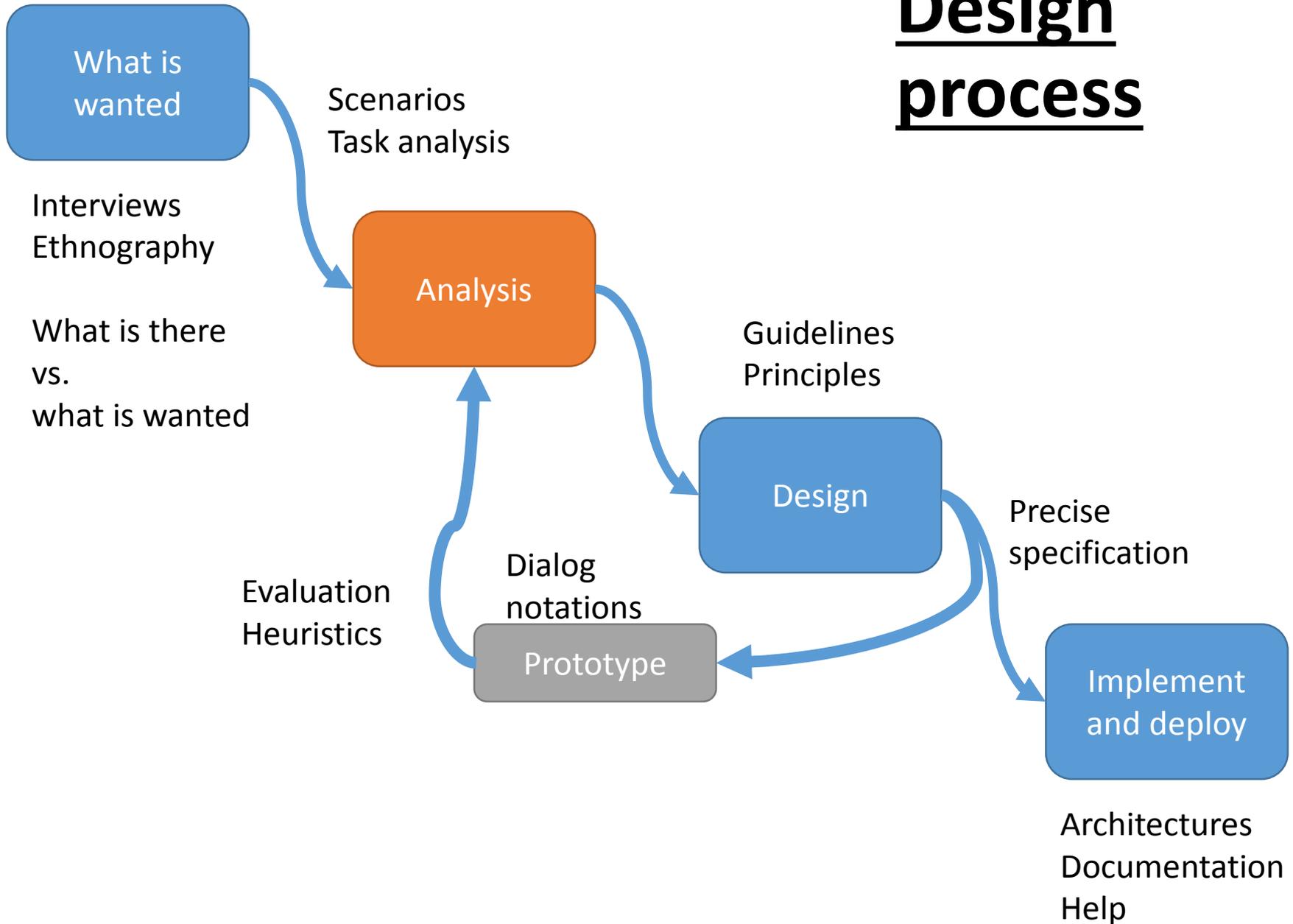
Without a button click

- Microphone
Record audio
- Camera
Uses the device's camera(s).
- Location
Uses the device's location. **Used by Ads**

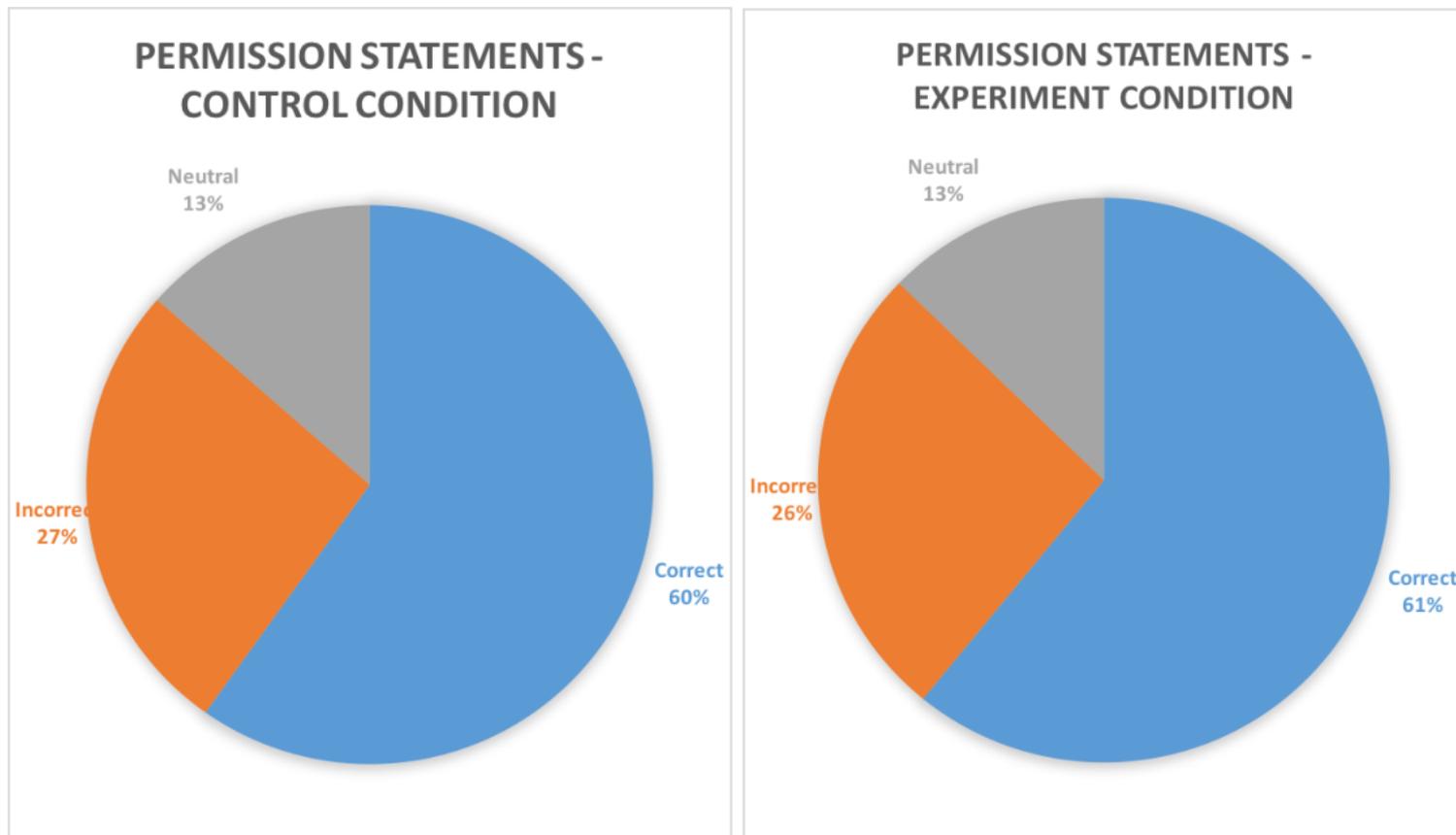
Which of the following can this app do?

	Absolutely Impossible	Impossible	Neutral	Possible	Absolutely Possible
Charge purchases to your credit card at any time.	<input type="radio"/>				
Get your location.	<input type="radio"/>				
Allow ads to know your location.	<input type="radio"/>				
Load ads.	<input type="radio"/>				
Write on the SD card					

Design process



The results:



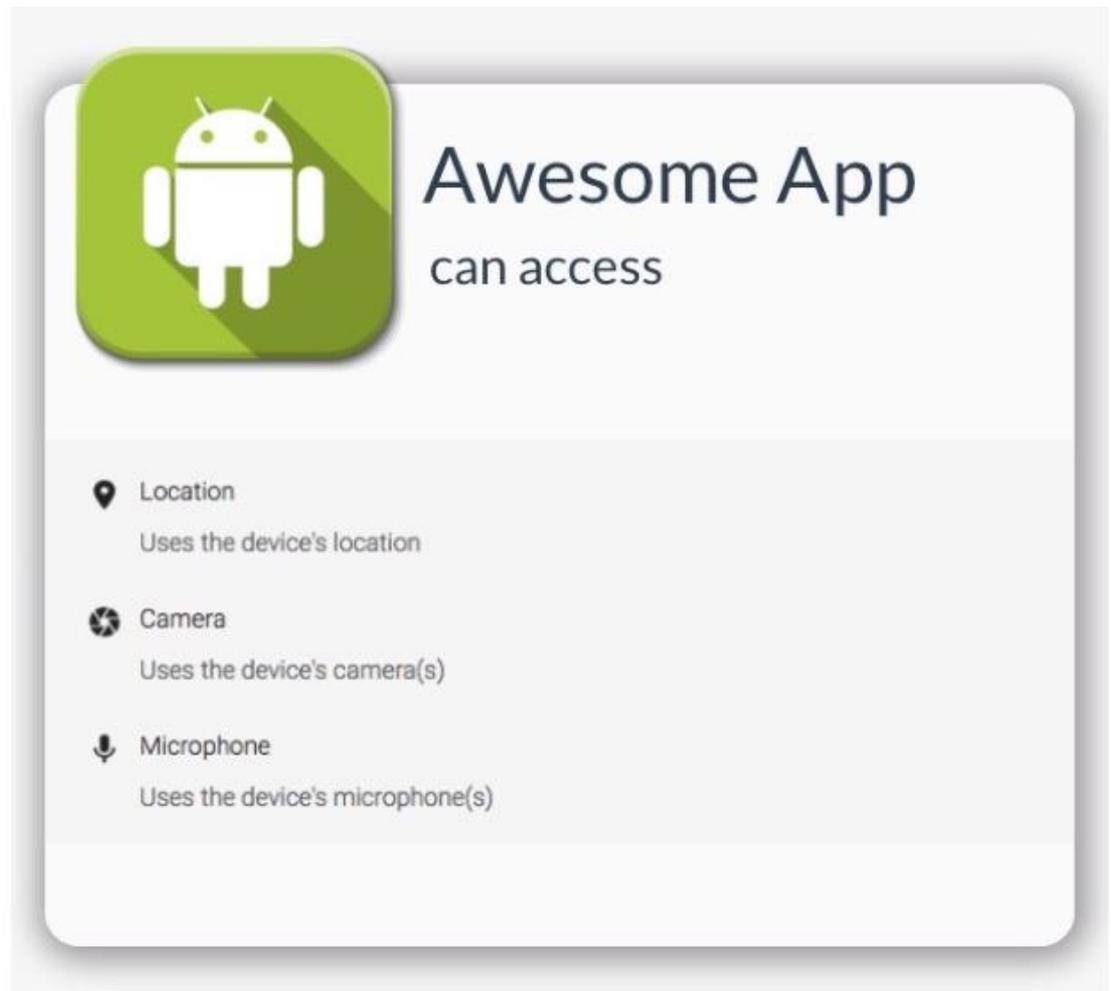
(a) Control Group

(b) Experiment Group

Figure 5.2: Permission Statements Results: Correct, Incorrect and Neutral

27% of people think they know what this screen says and are wrong.

13% are uncertain what this screen really means.



(a) Control group screen

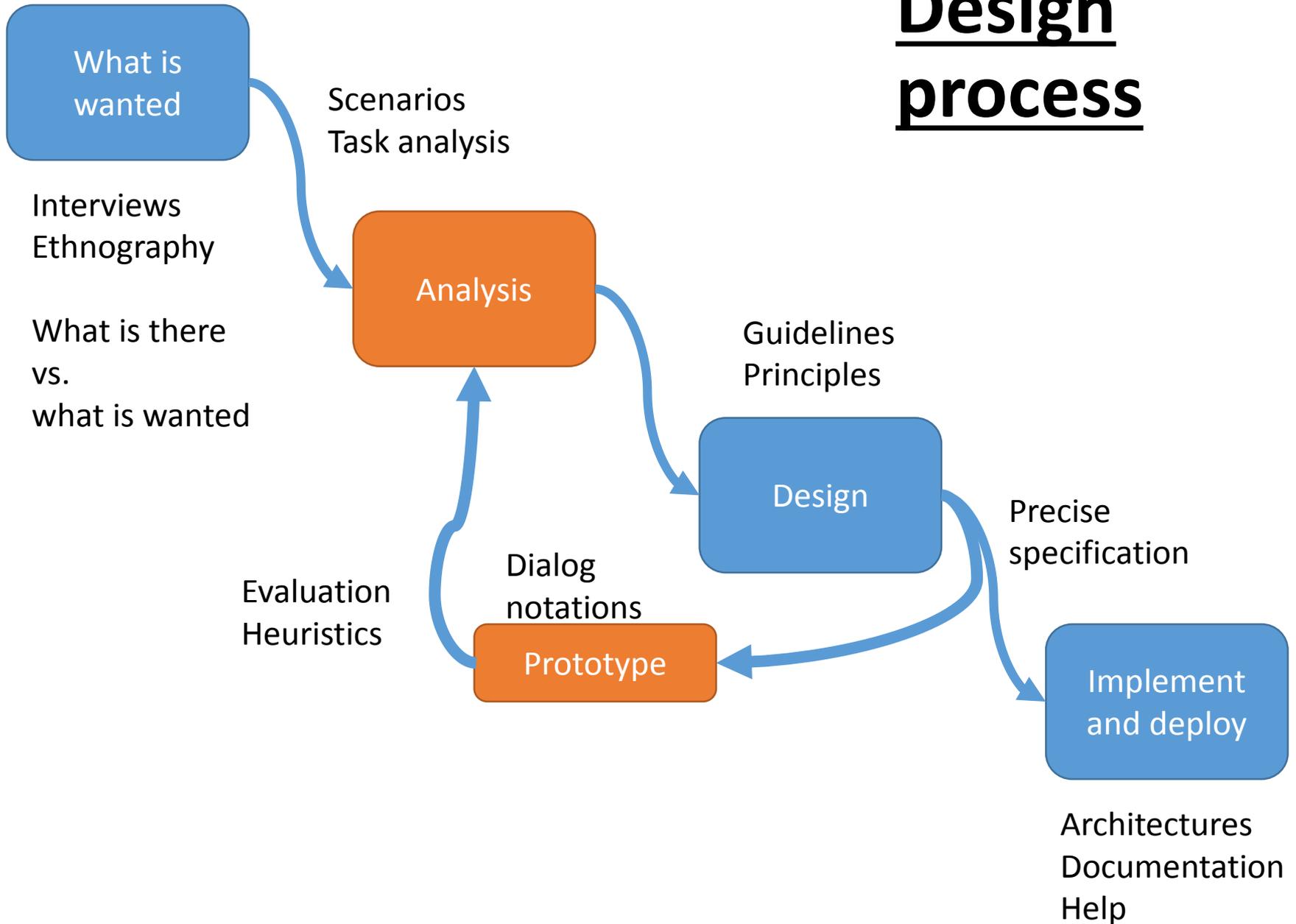
Case study from Nielsen Group

<https://www.nngroup.com/articles/fancy-formatting-looks-like-an-ad/>

Problem:

Why can't people find the population of the United States on the Censuses Bureau site?

Design process



Income, Poverty & Health Insurance

SEARCH: FAQs Census.gov

Data Finders

Population Clocks

U.S. 302,740,627

World 6,615,157,975

00:47 GMT (EST+5) Aug 31, 2007

Population Finder

 city/ town, county, or zip

 or state
 Select a state

Find An Area Profile with QuickFacts

 Select a state to begin...
 Select a state

Latest Economic Indicators

- [New Home Sales](#)
- [Advance Report on Durable Goods Manufacturers' Shipments, Inventories, and Orders](#)

Economic Indicators

 Select an indicator
 Select an indicator

Census 2000 - 2010 Census - Census 2000 Summary File 4 (SF-4) - Summary File 3

American Community Survey - Projections - State Median Income - Poverty - International - Generators - More

Economic Indicators - Survey of Business Owners - NAICS - Survey of Business Owners

Industry - Government - E-Stats - Foreign Trade | Export Codes - Local Employment Dynamics - More

Geography - Maps - TIGER - Gazetteer - More

Newsroom - Releases - Facts For Features - Minority Links - Broadcast & Photo Services - Embargo/News Release Subscription - More

Special Topics - Hurricane Data and Emergency Preparedness - Census Calendar - Training - For Teachers & Students - Statistical Abstract - FedState - USA.gov

86% of users failed to find the population of the US on this page. Why?

News
Data
American
Jobs
Calendar

Publications

Are You in a Survey?

About the Bureau

Regional Offices

Doing Business with Us

Related Sites



The website does quite a few things correctly

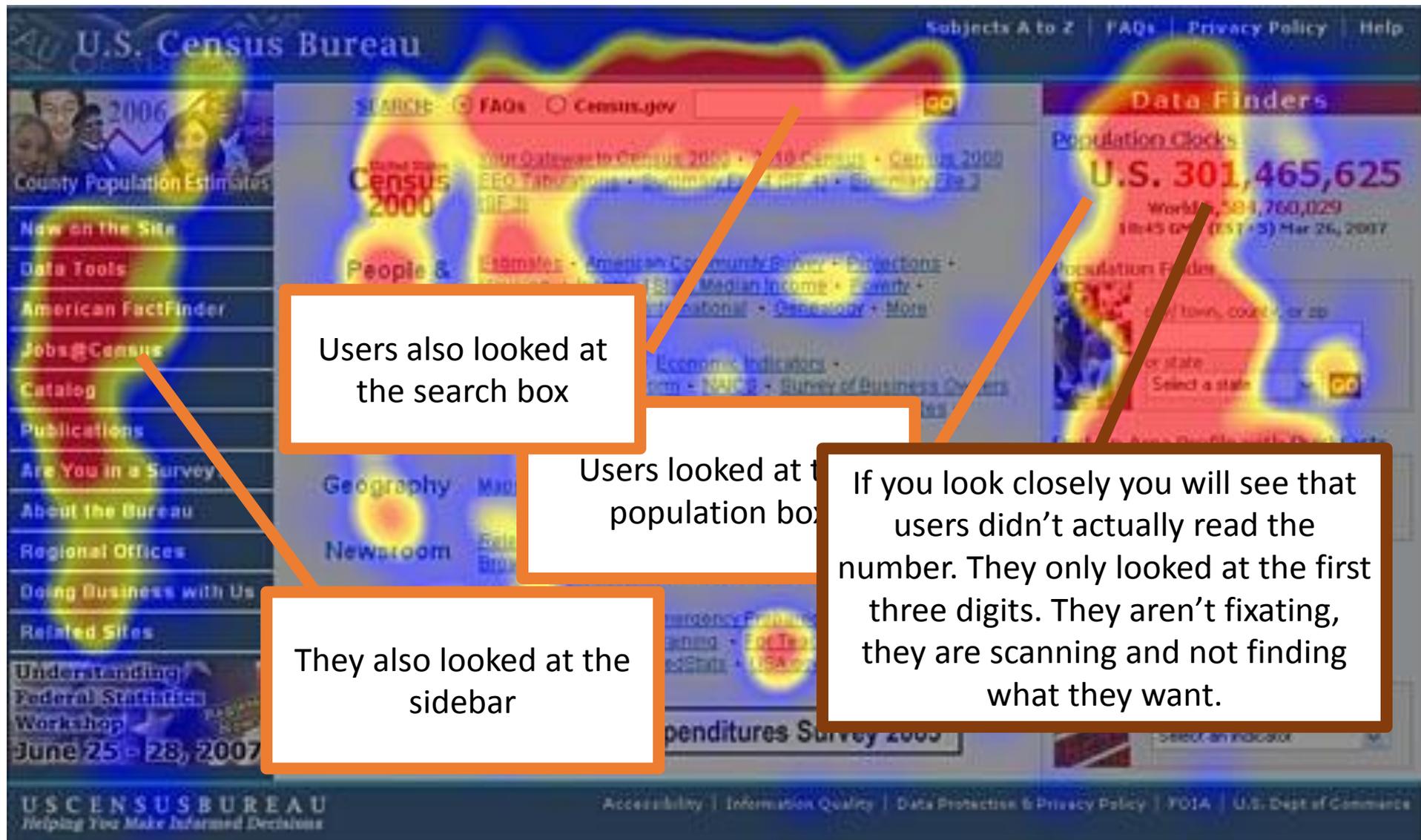
- Most common task is large, obvious, and red
- Sections of the page are clearly labeled
- There is a search box
- Lots of navigation cues
- Sidebars clear
- Good use of grouping

The screenshot displays the U.S. Census Bureau website interface. At the top, the header includes the U.S. Census Bureau logo, navigation links for 'Subjects A to Z', 'FAQs', 'Privacy Policy', and 'Help', and a search bar with a 'GO' button. The main content area is organized into several sections: 'Income, Poverty & Health Insurance Coverage' (highlighted in yellow), 'New on the Site', 'Data Tools', 'American FactFinder', 'Jobs@Census', 'Catalog', 'Publications', 'Are You in a Survey?', 'About the Bureau', 'Regional Offices', 'Doing Business with Us', and 'Related Sites'. The central content area features a 'SEARCH' box, a 'Census.gov' link, and a 'Your Gateway to Census 2000' section. Below this are categorized links for 'People & Households', 'Business & Industry', 'Geography', 'Newsroom', and 'Special Topics'. The right sidebar, titled 'Data Finders', prominently displays 'Population Clocks' with the U.S. population of 302,740,627 and a 'Population Finder' tool. At the bottom, the footer contains the U.S. Census Bureau logo, the tagline 'Helping You Make Informed Decisions', and links for 'Accessibility', 'Information Quality', 'Data Protection & Privacy Policy', 'FOIA', and 'U.S. Dept of Commerce'.

Methodology options:

- Think aloud (best choice)
 - Good: lots of data articulated, people can tell you what they are looking for
 - Bad:
- Heuristic
 - Good: No need to find a participant
 - Bad: Looking at the site there are no obvious heuristics seriously broken, so any result would be an educated guess
- GOMS – Not really appropriate
- Contextual Inquiry – Unlikely to be a contextual issue

These researchers decided to use an eye tracker in addition to asking the participant to complete the task in a lab



Users also looked at the search box

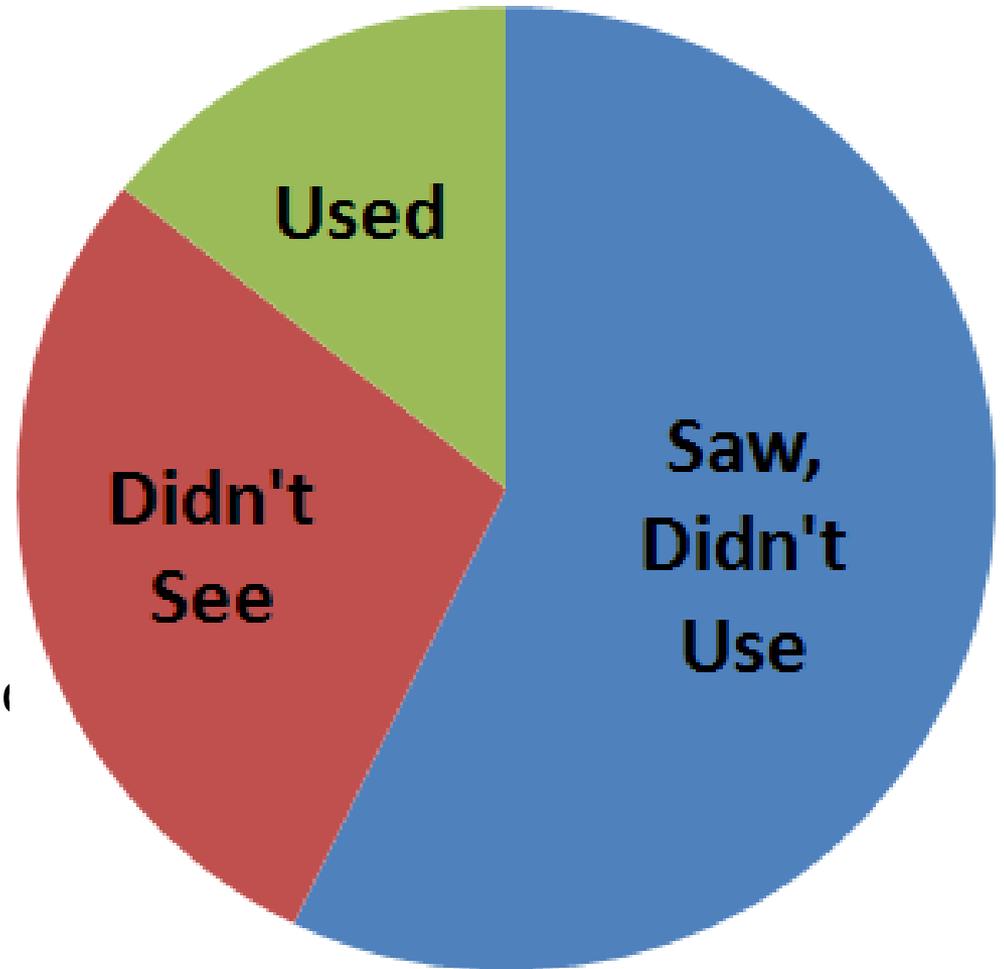
Users looked at the population box

They also looked at the sidebar

If you look closely you will see that users didn't actually read the number. They only looked at the first three digits. They aren't fixating, they are scanning and not finding what they want.

People didn't use the feature

- Only 14% of participants used the Population Check feature
- Why?
 - It looks like an advertisement
 - It uses terms like “Population Clocks” and “Data Finder” rather than “US Population”



U.S. Census Bureau

Subjects A to Z | FAQs | Privacy Policy | Help

A

SEARCH | FAQs | Census.gov

U.S. Census 2000
 2000 Census • 2010 Census • Census 2000
 2000 Tabulations • Summary File 4 (SF 4) • Summary File 3 (SF 3)

People & Households
 Estimates • American Community Survey • Projections • Housing • Income | State Median Income • Poverty • Health Insurance • International • Genealogy • More

Business & Industry
 Economic Census • Economic Indicators • Get Help with Your Form • **NAICS** • Survey of Business Owners • Government • E-Stats • Foreign Trade | Export Codes • Local Employment Dynamics • More

Geography
 Maps • TIGER • Gazetteer • More

Newsroom
 Releases • Facts For Features • Minority Links • Broadcast & Photo Services • Embargo Request • More

Special Topics
 Hurricane Data and Emergency Preparedness • Census Calendar • Training • For Teachers • Statistical Abstract • FedStats • USA.gov

NEW - Annual Capital Expenditures Survey 2005

Data Finders
Population Clocks
U.S. 301,465,607
 World 6,504,759,506
 10:41 GMT (EST-5) Mar 26, 2007

Population Finder
 city, town, county, or zip
 or state
 Select a state

Find An Area Profile with **QuickFacts**
 Select a state to begin
 Select a state

Latest Economic Indicators
 • New Home Sales
 • Housing Starts/Bulking Permits

Economic Indicators
 Select an indicator
 Select an indicator

USCENSUS BUREAU
 Helping You Make Informed Decisions

Accessibility | Information Quality | Data Protection & Privacy Policy | POIA | U.S. Dept. of Commerce

U.S. Census Bureau

Subjects A to Z | FAQs | Privacy Policy | Help

B

SEARCH | FAQs | Census.gov

U.S. Census 2000
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 2000 Tabulations • Summary File 4 (SF 4) • Summary File 3 (SF 3)

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NEW - Annual Capital Expenditures Survey 2005

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 World 6,504,759,506
 10:40 GMT (EST-5) Mar 26, 2007

Population Finder
 city, town, county, or zip
 or state
 Select a state

Find An Area Profile with **QuickFacts**
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 Select a state

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U.S. Census Bureau

Subjects A to Z | FAQs | Privacy Policy | Help

C

SEARCH | FAQs | Census.gov

U.S. Census 2000
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 2000 Tabulations • Summary File 4 (SF 4) • Summary File 3 (SF 3)

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 Helping You Make Informed Decisions

Accessibility | Information Quality | Data Protection & Privacy Policy | POIA | U.S. Dept. of Commerce

U.S. Census Bureau

Subjects A to Z | FAQs | Privacy Policy | Help

D

SEARCH | FAQs | Census.gov

U.S. Census 2000
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 Select an indicator

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 Helping You Make Informed Decisions

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CW2 Questions

Questions?